COMPREHENSIVE ABA PROGRAMS: INTEGRATING AND EVALUATING THE IMPLEMENTATION OF VARIED INSTRUCTIONAL APPROACHES

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There are a number of instructional approaches available within ABA, each of which is uniquely suited to address specific deficits in learners with Autism Spectrum Disorders. Clinicians can utilize a combination of Discrete Trial Instruction (DTT), naturalistic strategies, and rate-building procedures to maximize the acquisition, generalization, and availability of skills. Treatment integrity protocols are essential in training staff, in providing ongoing feedback to staff, and in ensuring high quality instruction for this diversity of instructional techniques.
Key words: Autism Spectrum Disorders, Discrete Trial Training, naturalistic strategies, rate-building procedures, staff training and feedback

INTENSIVE TEACHING

Discrete trial training (DTT) uses repetition and sequenced instruction to build core skills in students with autism (Lovaas, 1981; Lovaas, Koegel, Simmons, & Long, 1973; Smith, 1993). It has been successful in teaching a wide variety of skills in a structured, formalized context. Elements of its effective use include errorless learning procedures (e.g., Etzel & LeBlanc, 1979; Lancioni & Smeets, 1986; Terrace, 1963; Touchette & Howard, 1984) and task variation and interspersal (e.g., Dunlap, 1984; Mace, Hock, Lalli, West, Belfiore, Pinter, & Brown, 1988; Winterling, Dunlap, & O'Neill, 1987; Zarcone, Iwata, Hughes, & Vollmer, 1993). These strategies diverge from some historical applications of DTI, which often utilized blocks of identical target trials and procedures which allowed for repeated errors.

Discrete trial instruction is still very useful for teaching skills to children with autism, and its utility has not been eliminated with the emphasis on more naturalistic approaches. DTT is well suited to teaching skills requiring repetition, to teaching skills that are not intrinsically motivating, and to building solid repertoires of tacting, imitation, and receptive skills (e.g. Sundberg & Partington, 1998; 1999).

Naturalistic Teaching

Over the past two decades within ABA, there has been a strong focus on the use of naturalistic teaching methodologies to meet the needs of learners with autism. Incidental teaching emphasizes getting an elaborated response from the individual, after they have initiated interest in an item or a topic (Hart & Risley, 1982). Incidental teaching has been shown to be a powerful instructional methodology for building initiation skills and a wide variety of language and conversation skills (e.g., Farmer-Dougan, 1994; McGee, Krantz, & McClannahan, 1985; 1986). Furthermore, incidental teaching procedures have been shown to have substantial generalization advantages, compared to discrete trial teaching (McGee, Krantz, & McClannahan, 1985). These are substantial benefits, as the strength of DTT is in building responsivity, and relative weaknesses include failure to build initiation skills or generalize without additional training.

In incidental teaching, the teacher arranges the environment to spark the learner's interest. The learner then initiates a request or a conversation about a particular item or topic. The teacher prompts an elaboration of that initiation, and a more elaborate communication from the learner results in access to the desired item (Fenske, Krantz, & McClannahan, 2001). One of the most substantial advantages of an incidental approach over a DTT approach is that the learner is leading the teaching interaction. The learner's interests set the occasion for and drive the instruction (Fenske, Krantz, & McClannahan, 2001). Incidental teaching continues to be an excellent way to build spontaneity, increase initiation, and shape the complexity and sophistication of communication.

Other naturalistic methodologies within ABA have emphasized learner interests. Pivotal Response Training (PRT) and Natural Language Paradigm (NLP) emphasize the use of intrinsically motivating materials, teaching in natural contexts, and using the child's interests to guide instruction in language (Koegel, Koegel, & Surrat, 1992; Koegel, O'Dell, & Koegel, 1987; Laski, Charlop, & Schreibman, 1988).

Natural Environment Training (NET; Sundberg & Partington, 1998), similar to NLP and PRT, focuses on the use of intrinsically motivating materials and on following the child's lead in language instruction. NET also adds, however, the use of Skinner's Verbal Behavior language classification system to guide language instruc-

tion (Skinner, 1957). The use of this classification system ensures comprehensive attention to the functions of language. In addition, the emphasis Sundberg and Partington place on building manding (requesting) skills targets the very important response class of initiations.

DTT and naturalistic methods such as incidental teaching and NET target different deficits within autism spectrum disorders. Each methodology has distinct advantages and unique applications. While DTT is efficient and effective in teaching a wide variety of skills, there is almost always a need for generalization training procedures. Furthermore, while responsivity improves dramatically within DTT, initiation skills, requesting, and conversation may be best taught within more naturalistic methodologies.

Rate-Building and Fluency

Fluency has been defined as responding accurately, quickly, and without hesitation (Binder, 1996; Dougherty & Johnston, 1996). While fluency has been a goal of Precision Teaching, a field within the discipline of ABA instruction that has existed for many years and served many populations (e.g. Lindsley, 1992), it has only recently been focused on as a goal for learners with autism (Fabrizio & Moors, 2003).

Fluency based instruction is well-suited to addressing the specific deficits and needs of learners with autism. Many learners on the autism spectrum exhibit motor dysfluencies. While they may achieve mastery when accuracy is used to gauge success, they may still perform the task laboriously, inefficiently, or slowly. Furthermore, many individuals with ASD demonstrate a long latency to respond to instructions or to social initiations/bids. Slow response times can lead to missed opportunities, especially in social contexts (Weiss, 2001).

Fluency based instruction focuses on rate of response, and utilizes coaching to build performance. Practice sessions begin as very short sprints (e.g., 10 seconds), and increase as performance increases. A performance aim is used to guide daily progress (Fabrizio & Moors, 2003), and may be determined by a celebration line on a Standard Celeration Chart (or may be more individually determined by a learner's own rate.) Progress is tracked on a daily basis, and the learner is actively engaged in tracking progress.

Fluency has been associated with a number of outcomes of learning, which represent true mastery (Binder, 1996; Fabrizio & Morrs, 2003; Haughton, 1980; Johnson & Layng, 1992). Johnson & Layng (1992) emphasized the outcomes of Stability (capacity to engage in behavior in face of distraction); Endurance (capacity to engage in behavior for extended periods); Application (ability to generalize skills); and Retention (ability to maintain skills).

It has been shown that frequency building is essential to achieving fluency, yet nearly all instructional models for children with autism attend only to accuracy (and not to rate) to evaluate mastery (Fabrizio & Moors, 2003). Fabrizio and Moors (2003) have suggested the use of frequency aims in teaching students with autism, and have provided suggested aim ranges for core skills in this population of learners.

Advantages to rate building, and to achieving fluency, include the outcomes of fluency instruction (stability, endurance, application, retention), the addition of rate data, and the capacity to track and target errors separately from correct responses.

There is some debate within the field about whether fluency is achieved as a function of rate building per se (Doughty, Chase, & O'Shields, 2004). There are several potentially confounding variables that may be responsible for the effects. These include practice itself, as well as rate of reinforcement. Practice itself has been shown to facilitate learning (Samuels, 2002). The type and amount of practice opportunities offered to learners does effect mastery (Ericsson, Krampe, & Tesch-Romer, 1993). Learners given highly specific, immediate feedback and repetetive trials improve both their accuracy and speed. Furthermore, it is possible that the high reinforcement rates used in fluency-based instruction are responsible for the positive effects and outcomes. Finally, it may be that some of the benefits of fluency-based instruction can be achieved without a full implementation of this teaching protocol. For example, it may be that sensitizing staff to fluency building procedures (Binder, 1996) and tracking latency as a qualitative aspect of response may result in similarly socially valid learner outcomes.

Evaluating staff implementation of instructional techniques

As the complexity of ABA instruction increases, the need for more elaborate staff training procedures increases. Clearly, competency-based staff training procedures are essential in evaluating the skills of instructors. It has been demonstrated that didactic training alone is fairly ineffective in building skills (e.g., Noell & Witt, 1999; Noell, Witt, LaFleur, Mortenson, Ranier, & LeVelle, 2000). Instruction via lectures and workshops is minimally effective in the absence of follow-up interactive training (e.g., Krantz & McClannahan, 1993).

In contrast, Behavioral Skills Training has had substantial success in teaching a wide variety of skills. Components of BST include instructions, modeling/role play-

ing, and corrective feedback. The specific components of this approach have been well documented as effective training strategies. Modeling, or having trainers demonstrate the desired procedures is an important and effective aspect of behavioral skills training (e.g., Selinske, Greer & Lodhi, 1991). Research also supports the use of role playing in the training process (e.g., Ducharme & Feldman, 1992; Iwata, Wallace, Kahng, Lindberg, Roscoe, Conners, Hanley, Thompson, & Wordsell, 2000; Schepis, Reid, Ownbey, & Parsons, 2001). Perhaps the most crucial element of BST is feedback (Noell et al., 2000). Feedback generally entails providing individuals with highly specific verbal or written information regarding their performance of a particular skill, provided in order to improve performance (e.g., Alavosius & Sulzer-Azaroff, 1986).

This empirically driven BST approach has been used to teach staff to implement paired choice preference assessments (Lavie & Sturmey, 2002), to use incidental teaching to effectively prompt, correct and reinforce responses in natural contexts (Schepis, Reid, Ownbey & Parsons, 2001), to implement discrete trial instruction with learners with autism (Sarokoff & Sturmey, 2004), and to conduct analog functional analyses (Iwata et al., 2000; Wallace, Doney, Mintz-Resudek & Tarbox, 2004).

In addition to initial training goals, it is also imperative that trained staff maintain and continue to demonstrate targeted skills. Skills are most likely to be maintained in settings where consultation, training, and feedback are provided on an ongoing basis (e.g., Noell et al, 2000). Therefore, it is important to evaluate treatment integrity on an ongoing basis, to ensure quality programming and to prevent drift in the adherence to treatment protocols.

Tools which assist trainers and supervisors in objectifying the goals of instructional methods, in identifying core instructional elements to be modeled, and in providing specific feedback based on observations are useful both for initial training and for ongoing treatment integrity checks.

Operationalizing target skills in intensive teaching (interspersal)

When teaching staff to use and to maintain use of task interspersal procedures within an intensive teaching model, there are a number of variables which comprise competent instruction. In addition to all of the basic elements of effective instruction, such as the use of positive reinforcers, the effective use of prompting, and the use of error correction methods, staff members also need to be evaluated in skills specific to the use of interspersals. These include: the ratio of mastered to target items and the speed (pace) of instruction. Other elements of teaching that might be examined include the judicious use of break time, and the number of learning opportunities provided both during intensive teaching and during breaks. See Table 1 for sample targets.

Operationalizing target skills of mand training

When evaluating mand training, there are a number of factors relevant to ensuring appropriate implementation. First and foremost, attention to preference assessment, and to capturing motivational operations is of utmost importance (Sundberg & Partington, 1998). See Table 2 for a list of variables to assess in staff implementation of mand training.

What can be gained by incorporating a variety of ABA instructional methodologies into programming for children with autism? It is likely that the inclusion of a broader array of instructional approaches within ABA will result in more comprehensive programming and better learner outcomes (Fabrizio & Moors, 2003; Fenske, Krantz, & McClannahan, 2001; Weiss, 2001). Specific advantages to utilizing each of the instructional approaches discussed are substantial. DTT remains an excellent means of building a wide variety of skills. Naturalistic instructional approaches of all kinds are better suited to building initiation, spontaneity, conversational language and social skills. NET may be particularly effective in building manding skills (Sundberg & Partington, 1998). Focusing on building rate of responses may make responses more available and more timely in natural contexts.

In instructing staff, it is important to use an approach incorporating elements of Behavioral Skills Training: instruction, modeling/role playing, and corrective feedback based on direct observation. Competency-based skill assessment should also be ongoing, to ensure that the integrity of treatment protocols is not compromised over time.

Table 1: Intensive Teaching Treatment Integrity Form

Date: Instructor: Class: Student: Time Observed:

Teaching Methods		Comments
Was a positive reinforcer used?	Y N	
Were tasks mixed and varied?	Y N	
0 -2 second time delay prompt for all corrected items	Y N	% of time used appropriately:
Use appropriate error correction methods	Y N	Target: SD/ no response or incorrect/SD w/ prompt/2-3 mastered/original SD w/ prompt/2-3 mastered/original SD no prompt.Mastered: SD/no response or incorrect response/SD w/prompt/continue session
Use short ITI (1-2 s.)	Y N	Average:
Intersperse easy and hard tasks (mastered/target)(Goal: 80%-20%)		What %?
Fade in # of demands (behavioral momentum)		
Teacher paired with reinforcement?	Y N	
Was reinforcement delivered immediately?	Y N	
Did the instructor know what the VR schedule was?	Y N	VR schedule:
Rate of instructions delivered/ minute in session(Goal: 18-25/min.)		
Rate of instructions delivered/ minute overall (including breaks)(Goal: 6-9/min.)		
Rate of instructions delivered/opportunities captured on breaks/m.		
Number of times that the target(s) was/were practiced in the interspersal (Goal: minimum of 6 presentations)	Target	# times presented
Work Time	Time spent on IT:	Range:
	Average Work Time:	% of session spent on IT:
Break Time	Time spent on break:	Range:
	Average Break Time:	% of session spent on break:

Table 2: Mand Training Treatment Integrity Form

Instructor:
Observer:
Date:
Class:
Student:

Were reinforcers collected/assembled based on student preferences?	Y	N
Was there an ample supply of these items?	Y	N
Was an MO(EO) captured or contrived?	Y	N
Was the strength of an MO/EO assessed frequently?	Y	N
If an MO/EO was lost, did the instructor re-establish a strong MO/EO?	Y	N
Did the instructor count prompted and independent mands properly?	Y	N
Did the instructor use appropriate prompt-fading techniques for prompted mands?	Y	N
Was each mand reinforced immediately?	Y	N
Did the instructor track and then record the number of mands on a data sheet and/or graph?	Y	N
Did the instructor display positive affect and pair themselves with reinforcement?	Y	N

Table 3: Fluency-Based Instruction Treatment Integrity Form

Date: Instructor: Observer: Student:

Were materials plentiful/prepared?	Y N	
Did the instructor identify a student-selected motivator prior to timing?	Y N	
Did the instructor let the student know what the goal was?	Y N	Was student involved in process in an appropriate way?
Was the appropriate program conducted?	Y N	
Were the instructor and observer reliable in movements counted?	Y N	
Did the instructor select the appropriate goal and timing length?	Y N	
If the goal was not met did the instructor conduct additional timings until goal was met (not to exceed maximum)?	Y N	
Did the instructor utilize any troubleshooting techniques during this observation?	Y N	Were these appropriate and well executed?
Did the instructor coach the student (if necessary)?	Y N	
Did the instructor deliver reinforcement immediately upon reaching the daily goal?	Y N	
Was the instructor encouraging?	Y N	
If the goal was not met did the instructor provide positive feedback to the student (for effort)?	Y N	
Did the instructor record the data on a data sheet or directly onto the chart/graph?	Y N	
If charting the data on the SCC, was it charted correctly?	Y N	
Did the instructor prepare the goal and timing floor for the next day's practice?	Y N	

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